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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,972	03/27/2001	Katsuhisa Yuda	GOM-02001	9306

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EXAMINER	
CROWELL, ANNA M	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/818,972	Applicant(s) YUDA ET AL.	
	Examiner Michelle Crowell	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-12 and 15-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-12 and 15-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 26, 2004 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 17 requires a "grounded barrier contacts with a periphery of the chamber". The specification, specifically page 11, lines 10-27, fails to disclose this feature. In Figure 2, the grounded barrier 260 is close to the chamber; however, fails to touch the chamber. Additionally, it is well established that patent drawings do not define the precise proportions of

the elements and may not be relied on to show particular dimensions or features (i.e. grounded barrier in contact with chamber) if the specification is completely silent on the issue.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (U.S. 5,962,083) in view of Felts et al. (U.S. 5,364,665), Yuda (Japanese Patent Publication 11-168094), and Hayashi et al. (U.S. 5,578,130).

Referring to Figure 1 and column 3, line 15 – column 5, line 13, Hatanaka et al. discloses a plasma CVD apparatus for forming a silicon oxide film on a substrate comprising: a plasma generating region 1 which forms plasma of a first gas containing oxygen atoms (col. 3, lines 18-

29, line 55); a deposition region 4 which is placed on the substrate 7 so as to be separated from the plasma generating region (Fig. 1, col. 3, line 26); a grounded barrier 14 disposed between the plasma generating region and the deposition region and including at least one opening that connects the plasma generating region to the deposition region (Fig. 1, col. 3, line 57-col. 4, line 41, esp. col. 4, lines 28-30); a substrate holding mechanism 7a disposed in the deposition region (Fig. 1); a supply unit 6 which supplies second gas containing silicon atoms into the deposition region (col. 3, lines 30-45); and a control unit 24, 25 (Fig. 1, col. 5, line 12-13).

Hatanaka et al. fails to teach controlling a pressure of the deposition region

Referring to Figure 1 and column5, line 68-column 6, line 5, Felts et al. teaches a plasma processing apparatus having a control unit 27 for controlling the pressure 19 of the deposition region. It is well known in the art to control pressure in order to achieve the desired processing rate. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the control unit of Hatanaka et al. to control the pressure of the deposition region as taught by Felts et al. since this would achieve a desired processing rate.

Hatanaka et al. fails to teach that at least one opening has a diameter that is less than or equal to the Debye length of the plasma.

Referring to Drawings 8-10 and paragraph [0041], Yuda teaches a plasma processing apparatus wherein the diameter of an opening 30 is equal to the Debye length of the plasma in order to prevent plasma from the plasma generating region from leaking into the deposition region. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the at least one opening in the grounded barrier of Hatanaka et al. to have a

diameter that is equal to the Debye length of the plasma as taught by Yuda so that plasma from the plasma generating region can be prevented from leaking into the deposition region.

Referring to Figure 4 and column 10, lines 60-67, Hayashi et al. teaches a plasma processing apparatus wherein the diameter of an opening is less than the Debye length of the plasma in order to prevent plasma from the plasma generating region from leaking into a process region. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the at least one opening in the grounded barrier of Hatanaka et al. to have a diameter that is less than the Debye length of the plasma as taught by Hayashi et el. so that plasma from the plasma generating region can be prevent from leaking into the deposition region.

Moreover, Hatanaka et al discloses a control unit 24, 25 comprises an optical emission spectrometer 22 which spectrally detects luminescence of the deposition region 4 (col. 5, lines 7-13).

Additionally, Hatanaka et al. discloses an optical transmitting window is arranged at the chamber wall, which is preferably placed in the deposition region, and the optical emission spectrometer 22 measures a light beam passing through the light transmitting window (Fig.1, col. 5, lines 7-13).

Furthermore, Hatanaka et al. recites the claimed gases; however, the type of gases, *a first gas containing oxygen atoms, a deposition region including excitation oxygen molecules and excitation oxygen atoms, and a second gas containing silicon atoms in the deposition region*, used in apparatus claims are considered intended use and therefore are of no significance in determining patentability. Expressions relating the apparatus to contents thereof during an

intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault,164 USPQ 666, 667 (Bd. App. 1969).

With respect to claim 15, Hatanaka et al. fail to teach a grounded barrier which includes a hollow portion fluidly connected to the supply unit and further includes at least two openings, wherein a first opening of the at least two openings connects the plasma generating region to the deposition region and a second opening of the at least two openings connects the hollow portion to the deposition region.

Referring to Drawing 10 and paragraph [0043], Yuda teaches a plasma processing apparatus wherein a grounded barrier 26 includes a hollow portion fluidly connected to the supply unit 9, 24 and further includes at least two openings, wherein a first opening 30 of the at least two openings connects the plasma generating region to the deposition region and a second opening 27 of the at least two openings connects the hollow portion to the deposition region. By having the claimed openings configuration, the monosilane gases fail to mix with the oxygen radicals and particle adhesion is prevented from forming in/on the grounded barrier, and thus substrate contamination is prevented. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the grounded barrier of Hatanaka et al. with a hollow portion fluidly connected to the supply unit and further includes at least two openings, wherein a first opening of the at least two openings connects the plasma generating region to the deposition region and a second opening of the at least two openings connects the hollow portion to the deposition region as taught by Yuda since this would prevent particle adhesion on chamber parts, particularly the grounder barrier, and hence prevent substrate contamination.

7. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (U.S. 5,962,083) in view of Felts et al. (U.S. 5,364,665), Yuda (Japanese Patent Publication 11-168094), and Hayashi et al. (U.S. 5,578,130) as applied to claims 7 and 15 above, and further in view of Soma (Japanese Patent Publication 2000-055733) and O'Rourke et al. (U.S. 5,953,118).

The teachings of Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. have been discussed above.

Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. fails to teach a multi-channel optical emission spectrometer which has a thermoelectric cooling CCD.

Referring to paragraph [0001], Soma teaches a multichannel spectrometer used for optical characteristic analysis of a material. Multichannel spectrometer are used to measure the luminous intensity of different wavelength to coincidence. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the spectrometer of Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. to be a multichannel spectrometer as taught by Soma since it can measure the luminous intensity of different wavelength to coincidence.

Referring to column 6, lines 31-58 and column 8, lines 9-41, O'Rourke teaches a thermoelectric cooling CCD capable of exposure times from approximately 0.02 seconds to more than 30 seconds. Additionally, it is known in the art that CCD provide enhanced light sensitivities and that thermoelectric cooling provide the cooling necessary to prevent component warping, thereby increasing efficiency. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the multichannel spectrometer of Hatanaka et al in view of Felts, Yuda, Hayashi et al., and Soma with a thermoelectric cooling CCD since

enhanced exposure times, enhanced sensitivities, and cooling are achieved, thereby improving the efficiency and accuracy of the multichannel spectrometer.

Furthermore, the limitations of claims 10-12 are directed to method limitations instead of apparatus limitations and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. Furthermore, the apparatus of Hatanaka et al. in view of Felts et al., Yuda, Hayashi et al., Soma, and O'Rourke et al. is capable of measuring the deposition region and controlling the deposition condition.

Additionally, with regard to limitation reciting the excitation oxygen molecule having a peak near 761 nm and the excitation oxygen atom having a peak near 777 nm, this limitation is considered simply a characteristic. Therefore, since no structure has been claimed, patentable weight has not been given to this limitation.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (U.S. 5,962,083) in view of Felts et al. (U.S. 5,364,665) and Suzuki et al. and (U.S. 5,433,787).

Referring to Figure 1 and column 3, line 15 – column 5, line 13, Hatanaka et al. discloses a plasma CVD apparatus for forming a film on a substrate comprising: a plasma generating region 1 which forms plasma of a first gas (col. 3, lines 18-29, line 55); a deposition region 4 which is placed on the substrate 7 so as to be separated from the plasma generating region (Fig. 1, col. 3, line 26); a grounded barrier 14 disposed between the plasma generating region and the deposition region (Fig. 1, col. 3, line 57-col. 4, line 41, esp. col. 4, lines 28-30); a substrate

holding mechanism 7a disposed in the deposition region (Fig. 1); a supply unit 6 which supplies second gas into the deposition region (col. 3, lines 30-45); and a control unit 24, 25 (Fig. 1, col. 5, line 12-13).

Hatanaka et al. fails to teach controlling a pressure of the deposition region

Referring to Figure 1 and column5, line 68-column 6, line 5, Felts et al. teaches a plasma processing apparatus having a control unit 27 for controlling the pressure 19 of the deposition region. It is well known in the art to control pressure in order to achieve the desired processing rate. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the control unit of Hatanaka et al. to control the pressure of the deposition region as taught by Felts et al. since this would achieve a desired processing rate.

Moreover, Hatanaka et al discloses a control unit 24, 25 comprises an optical emission spectrometer 22 which spectrally detects luminescence of the deposition region 4 (col. 5, lines 7-13).

Additionally, Hatanaka et al. discloses an optical transmitting window is arranged at the chamber wall, which is preferably placed in the deposition region, and the optical emission spectrometer 22 measures a light beam passing through the light transmitting window (Fig.1, col. 5, lines 7-13).

Hatanaka et al. fail to teach a grounded barrier which includes a hollow portion fluidly connected to the supply unit and further includes at least two openings, wherein a first opening of the at least two openings connects the plasma generating region to the deposition region and a second opening of the at least two openings connects the hollow portion to the deposition region.

Referring to Figures 3-5 and column 9, line 19-column 10, line 26, Suzuki et al. teaches a plasma processing apparatus wherein a grounded barrier 15 includes a hollow portion fluidly connected to the supply unit and further includes at least two openings (col. 10, lines 1-20), wherein a first opening 16 of the at least two openings connects the plasma generating region to the deposition region and a second opening 17 of the at least two openings connects the hollow portion to the deposition region. By having the claimed openings configuration, the two gases fail to mix with each other and particle adhesion is prevented from forming in/on the grounded barrier, and thus an uniform film of high quality is achieved. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the grounded barrier of Hatanaka et al. with a hollow portion fluidly connected to the supply unit and further includes at least two openings, wherein a first opening of the at least two openings connects the plasma generating region to the deposition region and a second opening of the at least two openings connects the hollow portion to the deposition region as taught by Suzuki et al. since particle adhesion is prevented from forming in/on the grounded barrier, and thus an uniform film of high quality is achieved.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (U.S. 5,962,083) in view of Felts et al. (U.S. 5,364,665).

Referring to Figure 1 and column 3, line 15 – column 5, line 13, Hatanaka et al. discloses a plasma CVD apparatus for forming a silicon oxide film on a substrate comprising: a plasma generating region 1 which forms plasma of a first gas containing oxygen atoms (col. 3, lines 18-29, line 55); a deposition region 4 which is placed on the substrate 7 so as to be separated from

the plasma generating region (Fig. 1, col. 3, line 26); a grounded barrier 14 disposed between the plasma generating region and the deposition region (Fig. 1, col. 3, line 57-col. 4, line 41, esp. col. 4, lines 28-30); a substrate holding mechanism 7a disposed in the deposition region (Fig. 1); a supply unit 6 which supplies second gas containing silicon atoms into the deposition region (col. 3, lines 30-45); and a control unit 24, 25 (Fig. 1, col. 5, line 12-13).

Hatanaka et al. fails to teach controlling a pressure of the deposition region

Referring to Figure 1 and column5, line 68-column 6, line 5, Felts et al. teaches a plasma processing apparatus having a control unit 27 for controlling the pressure 19 of the deposition region. It is well known in the art to control pressure in order to achieve the desired processing rate. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the control unit of Hatanaka et al. to control the pressure of the deposition region as taught by Felts et al. since this would achieve a desired processing rate.

Moreover, Hatanaka et al discloses a control unit 24, 25 comprises an optical emission spectrometer 22 which spectrally detects luminescence of the deposition region 4 (col. 5, lines 7-13).

Additionally, Hatanaka et al. discloses an optical transmitting window is arranged at the chamber wall, which is preferably placed in the deposition region, and the optical emission spectrometer 22 measures a light beam passing through the light transmitting window (Fig.1, col. 5, lines 7-13).

Furthermore, Hatanaka et al. recites the claimed gases; however, the type of gases, *a first gas containing oxygen atoms, a deposition region including excitation oxygen molecules and excitation oxygen atoms, and a second gas containing silicon atoms in the deposition region,*

used in apparatus claims are considered intended use and therefore are of no significance in determining patentability. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault,164 USPQ 666, 667 (Bd. App. 1969).

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (U.S. 5,962,083) in view of Felts et al. (U.S. 5,364,665), Yuda (Japanese Patent Publication 11-168094), and Hayashi et al. (U.S. 5,578,130) as applied to claims 7 and 15 above, and further in view of Amemiya et al. (U.S. 5,385,624).

The teachings of Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. have been discussed above.

Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. fails to teach a grounded barrier contacting with a periphery of the chamber.

Referring to Figure 2 and column 4, lines 57-66, Amemiya et al. teaches a plasma processing apparatus having a plasma generation region and a plasma processing region and wherein a grounded barrier 38 contacts with a periphery of the chamber since this configuration more effectively traps ions in the plasma generation region from entering the processing region. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the grounded barrier of Hatanaka et al. in view of Felts et al., Yuda, and Hayashi et al. to contact a periphery of the chamber since this configuration more effectively traps ions in the plasma generation region from entering the processing region. Additionally, the arrangement of

a grounded barrier in contact with a periphery of the chamber is considered an obvious matter of design choice.

11. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuda (Japanese Patent Publication 11-168094) in view of Felts et al. (U.S. 5,364,665).

Referring to Figure Drawings 8-10 and paragraphs [0039]-[0043], Yuda discloses a plasma CVD apparatus for forming a silicon oxide film on a substrate comprising: a plasma generating region 6 which forms plasma of a first gas containing oxygen atoms (Drawing 8); a deposition region which is placed on the substrate 3 so as to be separated from the plasma generating region (Drawing 8); a grounded barrier 26 disposed between the plasma generating region and the deposition region (Drawings 8 and 10, par. [0041]); a substrate holding mechanism 2 disposed in the deposition region (Drawing 8); a supply unit 9 which supplies second gas containing silicon atoms into the deposition region (Drawing 8, par. [0041]); and wherein the grounded barrier 26 includes at least one opening 30 that connects the plasma generating region to the deposition region , and wherein the at least one opening 30 has a diameter that is equal to the Debye length (Drawings 8 and 10, par. [0041]).

Hatanaka et al. fails to teach a control unit which controls a pressure of the deposition region and which intentionally controls a first quantity of the excitation oxygen molecules and a second quantity of the excitation oxygen atoms.

Referring to Figure 1 and column 5, line 68-column 6, line 24, Felts et al. teaches a plasma processing apparatus having a control unit 27 for controlling the pressure 19 and the optical emission spectrometer 21 (control 1st and 2nd quantities of oxygen molecules) of the

deposition region. It is well known in the art to control pressure and the optical emission spectrometer in order to achieve the desired film process. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the control unit of Hatanaka et al. to control the pressure and the control 1st and 2nd quantities of oxygen molecules of the deposition region as taught by Felts et al. since this would achieve the desired film process.

With respect to claim 15, referring to Drawing 10 and paragraph [0043], Yuda teaches a plasma processing apparatus wherein a grounded barrier 26 includes a hollow portion fluidly connected to the supply unit 9, 24 and further includes at least two openings, wherein a first opening 30 of the at least two openings connects the plasma generating region to the deposition region and a second opening 27 of the at least two openings connects the hollow portion to the deposition region.

12. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Felts et al. (U.S. 5,364,665) in view of Ogawa et al. (U.S. 6,044,792), Hatanaka et al. (U.S. 5,962,083), Yuda (Japanese Patent Publication 11-168094), and Hayashi et al. (U.S. 5,578,130).

Referring to Figures 1 and 2, and column 5, line 43 – column 6, line 48, Felts et al. discloses a plasma CVD apparatus for forming a silicon oxide film on a substrate comprising: a plasma generating region 11 which forms plasma of a first gas containing oxygen atoms (col. 5, lines 55-60); a deposition region 11 which is placed on the substrate 13; a substrate holding mechanism 32 which is provided with the substrate in the deposition region (Fig. 2); a supply unit 15 which supplies second gas containing silicon atoms into the deposition region (col. 5,

lines 55-60); and a control unit 27 which controls a pressure 19 of the deposition region (Fig. 1, col. 6, lines 13-20).

Felts et al. fails to teach the plasma generating region separated from the deposition region.

Referring to Figures 4, 8, 9, column 14, line 61 – column 15, line 52, and column 17, line 36-column 18, line 9, Ogawa et al teaches a plasma CVD apparatus in which the plasma generating region 27, 33 is separate from the deposition region 21. It is conventionally known in the art to separate a plasma generating region from a deposition region in order to prevent substrate damage. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to separate the plasma generating region from the deposition region of Felts et al. as taught by Ogawa et al. in order to prevent substrate damage.

Felts et al. fails to teach a grounded barrier disposed between the plasma generating region and the deposition region.

Referring to Fig. 1, col. 3, line 57-col. 4, line 41, Hatanaka et al. teaches a plasma processing apparatus having a grounded barrier 14 disposed between the plasma generating region and the deposition region to increase the film deposition rate (col. 4, lines 23-30, lines 40-41). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Felts et al. in view of Ogawa et al. with a grounded barrier disposed between the plasma generating region and the deposition region since this would increase the film deposition rate.

Felts et al. in view of Ogawa et al. and Hatanaka et al. fails to teach that at least one opening has a diameter that is less than or equal to the Debye length of the plasma.

Referring to Drawings 8-10 and paragraph [0041], Yuda teaches a plasma processing apparatus wherein the diameter of an opening 30 is equal to the Debye length of the plasma in order to prevent plasma from the plasma generating region from leaking into the deposition region. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the at least one opening in the grounded barrier of Felts et al. in view of Ogawa et al. and Hatanaka et al. to have a diameter that is equal to the Debye length of the plasma as taught by Yuda so that plasma from the plasma generating region can be prevent from leaking into the deposition region.

Referring to Figure 4 and column 10, lines 60-67, Hayashi et al. teaches a plasma processing apparatus wherein the diameter of an opening is less than the Debye length of the plasma in order to prevent plasma from the plasma generating region from leaking into a process region. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the at least one opening in the grounded barrier of Felts et al. in view of Ogawa et al. and Hatanaka et al. to have a diameter that is less than the Debye length of the plasma as taught by Hayashi et el. so that plasma from the plasma generating region can be prevent from leaking into the deposition region.

Additionally, Felts et al. in view of Ogawa et al. discloses a control unit 27 comprises an optical emission spectrometer 21 which spectrally detects luminescence of the deposition region 11 (col. 6, lines 6-11).

Furthermore, Felts et al. in view of Ogawa et al. discloses an optical transmitting window 25 is arranged at the chamber wall, which is preferably placed in the deposition region, and the

optical emission spectrometer 21 measures a light beam passing through the light transmitting window (Fig.1, col. 6, lines 6-17).

Moreover, Felts et al. recites the claimed gases; however, the type of gases, *a first gas containing oxygen atoms, a deposition region including excitation oxygen molecules and excitation oxygen atoms, and a second gas containing silicon atoms in the deposition region*, used in apparatus claims are considered intended use and therefore are of no significance in determining patentability. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault,164 USPQ 666, 667 (Bd. App. 1969).

13. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Felts et al. (U.S. 5,364,665) in view of Ogawa et al. (U.S. 6,044,792), Hatanaka et al. (U.S. 5,962,083), Yuda (Japanese Patent Publication 11-168094), and Hayashi et al. (U.S. 5,578,130) as applied to claim 7 above, and further in view of Soma (Japanese Patent Publication 2000-055733) and O'Rourke et al. (U.S. 5,953,118).

The teachings of Felts et al. in view of Ogawa et al., Hatanaka et al., Yuda, and Hayashi et al. have been discussed above.

Felts et al. in view of Ogawa et al., Hatanaka et al., Yuda, and Hayashi et al. fail to teach a multi-channel optical emission spectrometer which has a thermoelectric cooling CCD.

Referring to paragraph [0001], Soma teaches a multichannel spectrometer used for optical characteristic analysis of a material. Multichannel spectrometer are used to measure the luminous intensity of different wavelength to coincidence. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the spectrometer of Felts et al. in

view of Ogawa et al., Hatanaka et al., Yuda, and Hayashi et al. to be a multichannel spectrometer as taught by Soma since it can measure the luminous intensity of different wavelength to coincidence.

Referring to column 6, lines 31-58 and column 8, lines 9-41, O'Rourke teaches a thermoelectric cooling CCD capable of exposure times from approximately 0.02 seconds to more than 30 seconds. Additionally, it is known in the art that CCD provide enhanced light sensitivities and that thermoelectric cooling provide the cooling necessary to prevent component warping, thereby increasing efficiency. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the multichannel spectrometer of Felts et al. in view of Ogawa et al., Hatanaka et al., Yuda, Hayashi et al. and Soma with a thermoelectric cooling CCD as taught by O'Rourke et al. since enhanced exposure times, enhanced sensitivities, and cooling are achieved, thereby improving the efficiency and accuracy of the multichannel spectrometer.

Additionally, the limitations of claims 10-12 are directed to method limitations instead of apparatus limitations and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do no patentably distinguish the claimed invention. Furthermore, the apparatus of Felts et al. in view of Ogawa et al. Hatanaka et al., Yuda, Hayashi et al., Soma, and O'Rourke is capable of measuring the deposition region and controlling the deposition condition.

Furthermore, with regard to limitation reciting the excitation oxygen molecule having a peak near 761 nm and the excitation oxygen atom having a peak near 777 nm, this limitation is

considered simply a characteristic. Therefore, since no structure has been claimed, patentable weight has not been given to this limitation.

Response to Arguments

14. Applicant's arguments with respect to claims 7-12 and 15-17 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC
May 21, 2004

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